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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,501	05/10/2005	Carlo Canteri	40111/GM/lp	5035

7590  
Modiano & Associati  
Via Meravigli, 16  
Milano, 20123  
ITALY

03/01/2007

EXAMINER
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MAYO, TARA L

ART UNIT	PAPER NUMBER
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3671

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/01/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/534,501

Applicant(s)

CANTERI, CARLO

Examiner

Tara L. Mayo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 36-70 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 36-70 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>20050510</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Introduction***

1. The preliminary amendment filed 15 May 2005 has been entered and an action on the merits appears below.

### ***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Objections***

3. Claim 40 is objected to because of the following informalities: an undefined abbreviation. In claim 40 on line 2, define the abbreviation "MDI." Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 42, 45, 51 and 54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regard to claim 42, the scope of the claimed invention is rendered indefinite by the recitation of "a reduction in the maximum expansion pressure, i.e. a dissipation after a degree of

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expansion thereof that may be less than 5 % of its initial volume.” Specifically, it is unclear how pressure can be defined in terms of loss of volume. For the purpose of prosecution on the merits, the Examiner has interpreted the limitation to simply mean a reduction in pressure. Furthermore, the effect of soil resistance on the expansion pressure of the substance cannot be discounted.

With regard to claim 45, the scope of the claimed invention is rendered indefinite by the recitation of “wherein a process of chemical reaction for expansion and said substance during expansion remain non-altered by water presence.” For the purpose of prosecution on the merits, the Examiner has interpreted the claim to mean that the chemical reaction is unaffected the presence of water.

With regard to claim 54, the scope of the claimed invention is unclear. Specifically, it is not understood what is meant by “wherein a direction of the longitudinal extension of said injection holes is contained between planes of arrangement of two larger opposite faces of the wall system.” It is unclear to what Applicant is referring with the recitation of “direction of longitudinal extension.” It is unclear what is meant by “planes of arrangement.” It is unclear to what element of the claimed invention the opposite faces are being compared with the recitation “larger than.” Claim 54 has not been further prosecuted on the merits.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 36 through 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over WIPO 9824982 in view of Crambes (U.S. Patent No. 4,832,535).

WIPO '982 discloses a method for reinforcing the structural integrity of a soil volume comprising the steps of:

with regard to claim 36,

providing spaced injection holes (1) within a system in a manner suitable to pass through cavities (i.e., soil voids);

inserting injection tubes (2) in said holes; and

injecting a substance (3) that expands after injection into said holes;

with regard to claim 37,

wherein the tubes are gradually retracted during injection (p. 4, lines 1 through 5);

with regard to claim 38,

wherein said injection holes are formed substantially at right angles to the largest surface of the cavities (i.e., soil voids);

with regard to claim 39,

wherein said substance is constituted by a closed-cell polyurethane foam (p.5, line 11);

with regard to claim 40,

wherein said substance is constituted by an MDI isocyanate and a mixture of polyols;

with regard to claim 41,

wherein said substance has a maximum expansion pressure substantially comprised by 20kPa and 200kPa (p. 9, lines 14 through 17);

with regard to claim 42,

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wherein the substance inherently experiences a reduction in the maximum expansion pressure as it propagates through the cell and the substance hardens;  
with regard to claim 43,

wherein the substance necessarily possesses a maximum expansion pressure that is lower than a bursting limit pressure of the system into which it is injected. Specifically, one having ordinary skill in the art of earth treatment at the time of invention would have selected a substance with a maximum expansion pressure less than a bursting limit pressure of the system such that the system would not experience failure during the step of injecting.

with regard to claim 44,

wherein the reaction time of the substance is comprised between 3 and 60 seconds (p. 5, lines 25 through 28);

with regard to claim 45,

wherein the chemical reaction is inherently unaffected by the presence of water;  
with regard to claim 46,

wherein said substance (i.e., closed cell polyurethane foam) inherently maintains a non-altered state in the presence of water;

with regard to claim 51,

wherein said substance (i.e., closed cell polyurethane foam) inherently possesses a lower relative density than water (i.e., floats on water);

with regard to claim 52,

wherein said injection holes are produced along substantially vertical directions (see Fig. 1);

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with regard to claim 55,

wherein the distance between two contiguous injection holes is substantially comprised between 0.20 m and 2.00 m (10 m; p. 10 at line 16);

with regard to claim 56,

wherein a diameter of said injection holes is substantially comprised between 4 mm and 40 mm (10 mm; p. 7 at line 29); and

with regard to claim 67,

monitoring with laser levels (p. 9 at line 20).

With regard to claims 47 through 50, the physical properties recited therein are inherent closed cell polyurethane foam.

WIPO '982 fails to teach:

the system being a wall;

the injection holes being inclined with respect to the vertical;

the injection tubes having an inlet and multiple outlets;

the passage section of the outlets being greater than the passage section of the inlets;

a lubricating material;

means for interrupting the injection of the substance;

a pressure gauge;

a flow rate measuring device;

piezometer pipes;

monitoring two faces of the wall system; and  
preliminary interventions in the form of column-type injections or spray covered  
geotextile fabric.

Crambes '535, as best seen in Figures 14 and 21, discloses a process for treating soil wherein injection holes are formed in a soil wall (21) substantially vertical or inclined with respect to the vertical. Crambes '535 further teaches preliminary interventions (25) to limit the escape of the substance from cavity outlets.

With regard to claim 36, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the method disclosed by WIPO '982 such that the reinforcing method would be performed on a wall system as taught by Crambes '535. The motivation would have been to reinforce the soil volume adjacent an excavation to prevent collapse.

With regard to claim 53, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the method disclosed by WIPO '982 such that it would further include injection holes produced along directions that are inclined with respect to the vertical as taught by Crambes '535. The motivation would have been to enhance the reinforcement of the soil volume.

With regard to claims 57 through 59 and 61 through 65, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the method disclosed by the combination of WIPO '982 and Crambes '535 such that the system would include an injection



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tube with an inlet and multiple outlets, the multiple outlets being greater than the inlet; a lubricating material; means for interrupting the injection of the substance; a pressure gauge positioned upstream of the inlet of the injecting tubes; a flow rate measuring device; and piezometer pipes. The Examiner takes Official Notice of these elements in a soil treatment system for effectively reinforcing a soil volume by way of injection of substance.

With regard to claim 60, the claimed method step of adjusting the rate of retraction according to a flow-rate of injection of the substance would have been an obvious modification to the method disclosed by WIPO '982 and Crambes '535 for one having ordinary skill in the art. The motivation would have been to ensure the desired degree of penetration of the substance into the cavities.

With regard to claim 66, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the method disclosed by the combination of WIPO '982 and Crambes '535 such that it would include the step of constantly monitoring two faces of the wall system during injection. The motivation would have been to prevent overfilling and subsequent rupture of the wall system.

With regard to claim 68, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the method disclosed by WIPO '982 such that it would include preliminary interventions as taught by Crambes '535. The motivation would have been to seal the substance in the injection holes.

With regard to claims 69 and 70, it would have been obvious to one having ordinary skill in the art at the time of invention to modify the method disclosed by WIPO '982 and Crambes '535 such that it would further include preliminary interventions in the form of column-type

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injections or spray-covered geotextile fabric since the Examiner takes Official Notice of the same as expedients for precluding the escape of an injected substance from a hole in earth treatment applications.

### *Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tara L. Mayo whose telephone number is 571-272-6992. The examiner can normally be reached on Monday through Friday 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas B. Will can be reached on 571-272-6998. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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27 February 2007

  
TARA L MAYO  
PATENT EXAMINER